CLAIMS

1. An optical disk device comprising:

a light source;

an objective lens for focusing light emitted from the light source on an optical disk;

an optical splitter for diffracting the light reflected by the optical disk; and

a photodetector on which the light diffracted by the optical splitter is focused,

wherein the optical splitter is divided into n ($n \geq 2$) regions Ak ($k = 1, 2, \ldots, n$) by a straight line that intersects with an optical axis,

the photodetector is divided into at least two regions A and A',

the light emitted from the light source is focused on any one of a plurality of signal planes of the optical disk by the objective lens,

light reflected from the signal plane on which the light emitted from the light source is focused (the focused plane) and light reflected from a signal plane located in proximity to the focused plane (a proximity plane) pass through the objective lens to turn into light beams a and a', respectively, that enter the optical splitter,

1st-order diffracted light beams ak and ak' having a common diffraction optical axis are derived from the light beams a and a' that have entered the regions Ak of the optical splitter, respectively, and are projected on the photodetector,

distributions of the 1st-order diffracted light beams ak and ak' on the photodetector are approximately inverted with respect to an intersection point of the diffraction optical axis and a detection plane, and

the 1st-order diffracted light beam ak is approximately within the region A and the 1st-order diffracted light beam ak' is approximately within the region A'.

2. The optical disk device according to claim 1, wherein the photodetector has at least two regions B and B' in addition to the regions A and A',

-1st-order diffracted light beams bk and bk' having a common diffraction optical axis are derived from the light beams a and a' that have entered the regions Ak of the optical splitter, respectively, and are projected on the photodetector,

distributions of the −1st-order diffracted light beams bk and bk' on the photodetector are similar to each other with respect to the intersection point of the diffraction optical axis and the detection plane, and

the −1st-order diffracted light beams bk and bk' are both approximately within the region B.

3. An optical disk device comprising:

a light source;

an objective lens for focusing light emitted from the light source on an optical disk;

an optical splitter for diffracting the light reflected by the optical disk; and

a photodetector on which the light diffracted by the optical splitter is focused,

wherein the optical splitter is divided into n ($n \geq 2$) regions Bk ($k = 1, 2, \ldots, n$) by a straight line that intersects with an optical axis,

the photodetector is divided into at least two regions B and B',

the light emitted from the light source is focused on any one of a plurality of signal planes of the optical disk by the objective lens,

light reflected from the signal plane on which the light emitted from the light source is focused (the focused plane) and light reflected from a signal plane located in proximity to the focused plane (a proximity plane) pass through the objective lens to turn into light beams b and b', respectively, that enter the optical splitter,

−1st-order diffracted light beams bk and bk' having a common diffraction optical axis are derived from the light beams b and b' that have entered the regions Bk of the optical splitter, respectively, and are projected on the photodetector,

distributions of the −1st-order diffracted light beams bk and bk' on the photodetector are approximately inverted with respect to an intersection point of the diffraction optical axis and a detection plane, and

the −1st-order diffracted light beam bk is approximately within the region B and the −1st-order diffracted light beam bk' is approximately within the region B'.

4. The optical disk device according to claim 3, wherein the photodetector has at least two regions A and A' in addition to the regions B and B',

1st-order diffracted light beams ak and ak' having a common diffraction optical axis are derived from the light beams b and b' that have entered the regions Bk of the optical splitter, respectively, and are projected on the photodetector,

distributions of the 1st-order diffracted light beams ak and ak' on the photodetector are similar to each other with respect to the intersection point of the diffraction optical axis and the detection plane, and

the 1st-order diffracted light beams ak and ak' are both approximately within the region A.

5. The optical disk device according to claim 2 or 4, wherein, where SA denotes a signal detected in the region A, SA' denotes a signal detected in the region A', SB denotes a signal detected in the region B, and SB' denotes a signal detected in the region B',

when the light emitted from the light source is focused on a first signal plane of the optical disk, the signal SA is regarded as a reproduction signal that is reproduced from the first signal plane (the focused plane) and the signal SA' is regarded as a reflected signal from a second signal plane (a proximity plane), and

when the light emitted from the light source is focused on the second signal plane of the optical disk, the signal SB is regarded as a reproduction signal that is reproduced from the second signal plane (the focused plane) and the signal SB' is regarded as a reflected signal from the first signal plane (the proximity plane).

6. The optical disk device according to claim 2 or 4, wherein, where SA denotes a signal detected in the region A, SA' denotes a signal detected in the region A', SB denotes a signal detected in the region B, and SB' denotes a signal detected in the region B',

a signal SA + SB – SA' – SB' is regarded as a reproduction signal that is reproduced from the signal plane on which the light emitted from the light source is focused (the focused plane) and a signal SA' + SB' is regarded as a reflected signal from a signal plane located in proximity to the focused plane (a proximity plane).

7. The optical disk device according to claim 5 or 6, wherein, when the proximity plane is on a side closer to the objective lens with respect to the

focused plane, an amount of light emitted from the light source is controlled in accordance with the reflected signal from the proximity plane.

8. The optical disk device according to claim 2 or 4, wherein a portion of the photodetector that includes the regions A and B and does not include the regions A' and B' is divided further into a plurality of regions, and a focus error signal that indicates an error in focusing with respect to the optical disk is generated by calculating signals detected in the plurality of regions.